

CLAIMS:

Sub.C3

1. A pestivirus which contains one or more mutations in the region containing stem-loops Ia and Ib of the 5' nontranslated region (NTR) of the pestivirus genome, which mutation results in a small plaque size phenotype, and in which the expression of the viral polyprotein is under the control of a homologous internal ribosome entry site (IRES) and the sequence at the 5' end of the genome is GUAU.

10 2. The pestivirus according to claim 1, characterised in that the pestivirus has more than one mutation in the 5'NTR.

15 3. The pestivirus according to claim 1, characterised in that the mutation is a deletion of one or more nucleotides.

4. The pestivirus according to claim 3, characterised in that the mutation is a deletion of stem-loop Ia.

20 5. The pestivirus according to claim 4, characterised in that the mutation is a deletion of stem-loop Ia and part of stem-loop Ib.

6. The pestivirus according to claim 4, characterised in that the mutation is a deletion of stem-loops Ia and Ib, provided that the 5' terminal sequence is GUAUAU or

25 25 GUAUCCU.

7. The pestivirus according to claims 1 - 4, characterised in that if the loop portion of stem-loop Ib is present, then the loop consists of five adenosine (A) residues.

30 8. The pestivirus according to claims 1 - 7, characterised in that the pestivirus is BVDV-1 or BVDV-2.

35 9. A vaccine comprising a live attenuated pestivirus according to claims 1 - 8, and a pharmaceutically acceptable carrier or diluent.

10. The vaccine according to claim 9, which contains an adjuvant.

11. The vaccine according to claim 9, which is in freeze-dried or frozen form.

12. The vaccine according to claim 9, which comprises an live attenuated BVDV and an immunogen derived from one or more of bovine rotavirus, bovine respiratory syncytial virus, bovine herpesvirus type 1, bovine coronaviruses, parainfluenza type 3 virus, bovine paramyxovirus, foot and mouth disease virus, infectious bovine rhinotracheitis virus and *Pasteurella hemolytica*.

13. A method of immunizing against a pestivirus-induced disease, comprising administering to an animal the vaccine according to claims 9 - 12.

14. A method of making a vaccine for the protection of an animal against a pestivirus, comprising mixing together a pestivirus according to claims 1 - 8 with a pharmaceutically acceptable carrier.

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